

JAPAN

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JIS B 6516 (1989) (English): Test methods for performance and accuracy of planer knife grinding machines

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The citizens of a nation must honor the laws of the land.

Fukuzawa Yukichi

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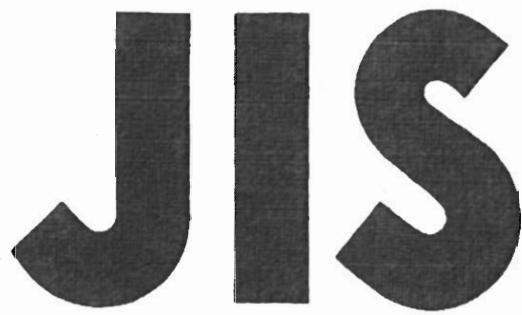


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JAPANESE INDUSTRIAL STANDARD

**Test Methods for Performance
and Accuracy of Planer
Knife Grinding Machines**

JIS B 6516-1989

Translated and Published

by

Japanese Standards Association

In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

Test Methods for Performance and Accuracy of Planer Knife Grinding Machines B 6516-1989

1. Scope

This Japanese Industrial Standard specifies the test methods related to functions, running performances and rigidities, and the methods of inspection on static accuracies and machining accuracies of the manual knife grinders specified in No. 6821 and the automatic knife grinders specified in No. 6822 of JIS B 0114, hereinafter referred to as the "knife grinding machine", of 400 mm or over to 900 mm or under in length of knife stock.

Remark: In this Standard, units and numerical values given in { } are in accordance with the conventional units, and are appended for informative reference.

2. Methods for Functional Tests

The functional tests for the knife grinding machines shall be in accordance with Table 1.

Applicable Standards:

JIS B 0114-Glossary of Terms for Wood Working Machinery

JIS B 6507-General Code of Safety for Wood Working Machinery

JIS B 6521-Methods of Measurement for Noise Emitted by Wood Working Machinery

Reference Standards:

JIS B 6501-Test Code for Performance and Accuracy of Wood Working Machinery

JIS Z 8203-SI Units and the Use of their Multiples and of Certain other Units

Table 1. Functional Tests

No.	Test item	Test method
1	Electric apparatus	Before and after the running test, examine the insulating conditions once each.
2	Start, stop and running operation of wheel spindle	At an appropriate wheel spindle speed of rotation, carry out 10 times of start and stop continuously to examine the smoothness and reliability of actions.
3	Changing operation of wheel spindle speed of rotation	Change the wheel spindle speed of rotation over entire marked speeds of rotation to examine the smoothness of the actions and reliability to the indication of the operating device.
4	Operation of hand feed handle of table	Travel the table in the left and right by the hand feed handle to examine the smoothness and uniformity of workings throughout the overall length of the motion. Carry out the similar examination also in the front and rear direction of the table.
5	Changing operation of table feed speed	Change the table feed speed over entire marked indications to examine the smoothness of the work and reliability of indications of the operating device.
6	Operation of automatic reversing of table	Travel the table at the minimum and maximum speeds in the left and right direction to examine, regarding the positioning of the automatic reversing and working, the smoothness and reliability respectively.
7	Operation of knife stock	Rotate the knife stock and fix at an arbitrary position to examine the smoothness and reliability of work and the reliability of fixing as well.
8	Changing operation of power cross feed amount of wheel spindle or table	Change the power cross feed amount of wheel spindle or table from the maximum to the minimum to examine the smoothness of workings and reliability of indications of the operating device.
9	Operation of hand feed handle of wheel spindle travel	Travel the wheel spindle in crosswards or vertically by the hand feed handle to examine the smoothness and uniformity of workings throughout the overall length of the motion.
10	Operation of automatic stop position of wheel spindle automatic infeed	Run the machine at the maximum and the minimum automatic infeed amounts of the wheel spindle to examine, with respect to the setting and workings of the automatic stop device, the smoothness and reliability respectively.

Table 1. (Continued)

No.	Test item	Test method
11	Mounting and dismounting of grinding wheel	Examine the reliability and smoothness of mounting and dismounting of grinding wheel and clamping screw.
12	Mounting and dismounting of planer knife	Examine the reliability and smoothness of mounting and dismounting of planer knife.
13	Safety device	Examine the reliability of safety functions for workers and protecting functions for machine (See JIS B 6507).
14	Lubricating device	Examine the reliability of such functions as oiltightness and proper distribution of oil quantity.
15	Oil hydraulic apparatus	Examine the reliability of such functions as oil tightness and pressure control.
16	Pneumatic pressure apparatus	Examine the reliability of such functions as air tightness and pressure control.
17	Cooling apparatus	Examine the reliability and uniformity of the coolant supply
18	Accessories	Examine the reliability of functions.

Remark: For those knife grinding machines which are not provided with some functions concerned, the equivalent test items given in this Table shall be omitted.

3. Methods of Running Test

3.1 Noload Running Test Rotate the wheel spindle, measure the required electric power and noises after the bearing temperature has been stabilized by continuous running for 30 to 60 min, and record respective items specified in the Record Format 1 of Table 2. In parallel to this, observe by sense of touch that no abnormal vibration exists.

Furthermore, the measurement of the noises shall be in accordance with JIS B 6521.

Table 2. Record Format 1

No.	Time of measurement: o'clock, minute	Wheel spindle	Speed of rotation of wheel spindle min^{-1} (rpm)		Temperature °C		Required electric power		Noise dB (A)	Description	
					Main spindle bearing		Room temperature	Voltage V	Current A	Input kW	
			Marking	Actual measure- ment	Left (upper)	Right (lower)					
		Vertical wheel spindle									
		Horizontal wheel spindle									

- Remarks 1. For that is provided with the speed change device of wheel spindle speed of rotation, it shall be recorded in respect to the speed of rotation of at least 2 levels including the maximum speed of rotation.
2. Regarding the measuring conditions of noises, these shall be recorded in the description column.

3.2 Load Running Test Carry out the grinding of the planer knife, measure the required electric power and noises, and record respective items specified in the Record Format 2 of Table 3. In parallel to this, observe by sense of touch and visual inspection that no abnormal vibration exists and the conditions of the ground surface.

In the measurement of the required electric power, carry out the test either by changing the depth of cut at a constant feed rate, or by changing the feed rate at a constant depth of cut.

Table 3. Record Format 2

No.	Planer knife			Grinding wheel				Grinding conditions			Required electric power				Description								
	Dimensions			Fine finish	Rough finish	Division of use	Diameter	Thickness	Abrasive grains	Grain size	Bonding degree	Bonding agent	Wheel spindle speed min ⁻¹ {rpm}	Feed rate mm/min	Depth of cut(1)	Grinding width	V	A	Current	Input	Grinding power $P_1 - P_0$ kW	No load P_0 kW	Load P_1 kW
	Length mm	Width mm	Thickness mm																				

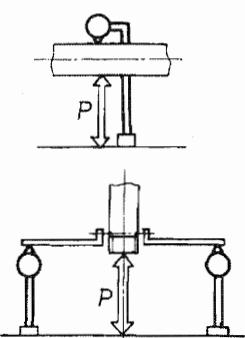
Note (1) For the depth of cut in this case, the infeed amount of the grinding wheel shall be recorded.

- Remarks 1. For the shape of the grinding wheel, main dimensions shall be noted in Figure.
2. Regarding the finish grinding, the measurement of grinding power may be omitted.

4. Methods of Rigidity Tests

The rigidity tests of the planer knife grinding machine shall be in accordance with Table 4.

Table 4. Rigidity Test

No.	Test item	Measuring method	Figure for measuring method
1	Flexural rigidity of wheel spindle system	<p>Apply a fixed test indicator to the end of wheel spindle (side face), apply loads (P) confronting with the former to the wheel spindle in vertical direction or horizontal direction(²), and measure the deflection of the wheel spindle.</p> <p>Carry out these measurements, each in vertical and horizontal directions or in left and right and front and rear directions.</p>	
2	Overall rigidity of wheel spindle and knife mounting face	<p>Measure the relative displacement between the wheel spindle and the upper face of knife mounting face, when a load (P) has been applied vertically between the wheel spindle(³) and the knife mounting face.</p> <p>Carry out these measurements at the centre of knife mounting face for the left and right directions, and at the cutting edge side of the mounting face for the front and rear directions.</p>	

Notes (2) The position to which the load is applied should be the nearer position to the wheel spindle end as far as possible, and the distance from the end of wheel spindle is to be recorded.

(3) Regarding that of which wheel spindle head or wheel spindle sleeve is allowed to move up and down, measurements shall be carried out fixing at the centre of its motion.

- Remarks
- For the rigidity tests on the machines of the same design, the test results obtained from a representative set of machine may be allowed to represent these, and for others, may be exempted from testings.
 - Regarding the magnitude of load (P), a load (P) recommended by the manufacturer is applied to examine, and this load (P) shall be recorded.
 - These measurements shall be carried out while rotating the main spindle, after the bearing temperature has been stabilized.

5. Methods of Static Accuracy Inspection

The static accuracy inspection of the planer knife grinding machine shall be in accordance with Table 5.

Table 5. Static Accuracy Inspections

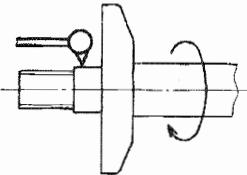
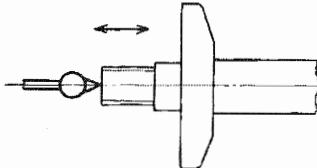
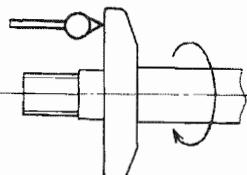
No.	Inspection item	Measuring method	Figure for measuring method	Permissible value Unit: mm
1	Runout on wheel spindle	Apply a test indicator to the outer peripheral face of the grinding wheel mounting part, rotate the wheel spindle manually, and consider the maximum difference of readings of the test indicator during rotation to be the measured value.		0.02
2	Movement of wheel spindle in axial direction	Apply a test indicator to the end of the wheel spindle, shake the wheel spindle in axial direction ⁽⁴⁾ , and consider the maximum difference of the readings of the test indicator to be the measured value.		0.02 for cup wheel 0.03 for flat wheel
3	Runout of flange face	Apply a test indicator to the flange face, rotate the wheel spindle manually, and consider the maximum difference of readings of the test indicator during rotation to be the measured value.		0.02 per 100 of diameter

Table 5. (Continued)

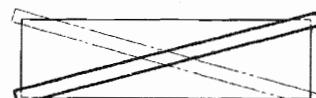
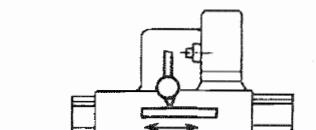
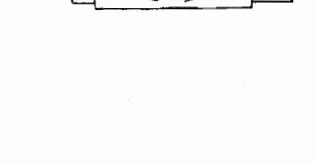
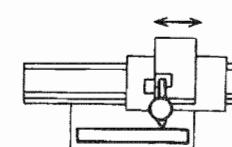
No.	Inspection item	Measuring method	Figure for measuring method	Unit: mm Permissible value
4	Straightness of mounting face of planer knife	Place a straightedge ⁽⁵⁾ of 1000 mm on the mounting face of the planer knife diagonally, measure clearances with a feeler gauge, and consider the maximum value thereof to be the measured value.		0.03 per 1000
5	Straightness of side face of knife stock	Place a straightedge ⁽⁵⁾ of 1000 mm on the side face of knife stock, measure clearances with a feeler gauge, and consider the maximum value thereof to be the measured value.		0.03 per 1000
6	Straightness of longitudinal motion of knife stock	Place a straightedge on the planer knife mounting face in parallel to the travelling direction of the knife stock ⁽⁶⁾ , apply a fixed test indicator to this, travel the knife stock longitudinally, and consider the maximum difference of the readings of the test indicator to be the measured value.		0.04 per 1000
				0.04 per 1000

Table 5. (Continued)

Unit: mm

No.	Inspection item		Measuring method	Figure for measuring method	Permissible value
7	Straightness of longitudinal motion of wheel stock	Within vertical plane	Place a straightedge on the planer knife mounting face in parallel to the travelling direction of the wheel stock ⁽⁶⁾ , apply a fixed test indicator to this, travel the wheel stock in left and right, and consider the maximum difference of the readings of the test indicator to be the measured value.		0.04 per 1000
		Within horizontal plane			0.04 per 1000

Notes (*) The force to shake in axial direction shall be approximately 150 N {approximately 15 kgf}.

- (⁵) In the case where the measuring distance is smaller than the reference, the numerical value for the permissible value of measurement shall be converted in proportion to the distance.
- (⁶) The straightedge shall be so adjusted that the readings of the test indicator coincide at the both ends of the travelling distance of the knife stock.

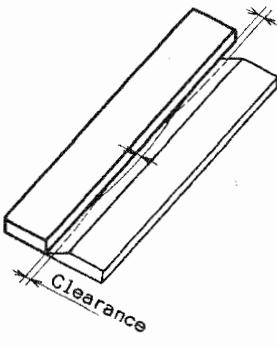
Remark: For those knife grinding machines which are not provided with some functions concerned, the equivalent inspection items given in Table 5 shall be omitted.

6. Method of Inspection on Machining Accuracy

The inspection on the machining accuracy of the planer knife grinding machine shall be accordance with Table 6.

Table 6. Inspection on Machining Accuracy

Unit: mm

No.	Inspection item	Measuring method	Figure for measuring method	Permissible value
1	Straightness of planer knife edge	After a planer knife of approximately the maximum grinding dimension in length of the marking has been ground, apply a straightedge to its cutting edge, measure clearances with a feeler gauge throughout the overall length ⁽⁷⁾ , and consider the maximum value thereof to be the measured value.		0.04 per 500

Note ⁽⁷⁾ Measure the clearances as mounted state to the knife stock.

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Japanese Text

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